Amendments to the Claims

Please amend the claims as follows.

1. (Amended) A method of operating a process analysis system to analyze a process, the method comprising:

in a plurality of sensors, monitoring the process to generate sensor signals that indicate sensor data for the process, wherein the process comprises a system that supplies water;

in a processing system, processing the sensor signals to determine a deviation between the sensor data and a baseline for the process detect a deviation from a baseline for the process;

in the processing system, comparing the deviation to a threshold and generating a trigger if the deviation exceeds the threshold;

in the processing system, generating a process vector representing for the deviation in response to detecting the deviation; and

in the processing system, in response to the trigger, comparing the process vector representing the deviation to a plurality of library vectors representing abnormal operating conditions to classify the deviation; and

signaling a control system to perform a treatment on the water in response to classifying the deviation as a contaminant in the water.

2. (Cancelled)

3. (Amended) The method of claim 33 1 wherein the sensor signals indicate pH, conductivity, turbidity, chlorine, and total organic carbon of the water.

4. (Cancelled)

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5. (Amended) The method of claim ~~1 wherein signaling the control system to perform the treatment on the water comprises~~ 33 further comprising signaling ~~the~~ a control system to operate a valve in response to classifying the deviation as ~~the~~ a contaminant in the water.

6. (Amended) The method of claim ~~1 wherein signaling the control system to perform the treatment on the water comprises~~ 33 further comprising signaling ~~the~~ a control system to add a marker to the water in response to classifying the deviation as ~~the~~ a contaminant in the water.

7. (Original) The method of claim 6 wherein the marker comprises a colorant.

8. (Cancelled)

9. (Amended) The method of claim ~~1~~ 35 wherein the treatment comprises adding a disinfectant to the water.

10. (Amended) The method of claim ~~1~~ 35 wherein the treatment comprises adding chlorine to the water.

11. (Amended) The method of claim ~~1~~ 35 wherein the treatment comprises exposing the water to ultraviolet radiation.

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12. (Amended) The method of claim 1 wherein processing the sensor signals to detect the deviation <u>and comparing the deviation to the threshold</u> <s>from the baseline</s> comprises processing the sensor signals to produce a single variable and comparing the single variable to <u>the</u> <s>a</s> threshold.

13. (Amended) The method of claim 1 wherein generating the process vector <u>representing</u> <s>for</s> the deviation comprises generating a unit vector.

14. (Amended) The method of claim 1 wherein comparing the process vector <u>representing the deviation</u> to the library vectors <u>representing the abnormal operating conditions</u> comprises comparing an angle between the process vector and one of the library vectors to <u>another</u> <s>a</s> threshold.

15. (Amended) The method of claim 1 wherein <s>the library vectors are associated with abnormal operations and</s> classifying the deviation comprises identifying one of the abnormal <u>operating conditions represented by</u> <s>operations that is associated with</s> one of the library vectors that matches the process vector.

16. (Amended) The method of claim 1 further comprising, in response to an unknown classification, storing the process vector as a new one of the library vectors and associating <s>an</s> <u>a new</u> abnormal <u>operating condition</u> <s>operation</s> with the new library vector.

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17. (Amended) A process analysis system comprising:

a plurality of sensors configured to monitor a process to generate sensor signals that indicate sensor data for the process, ~~wherein the process comprises a system that supplies water~~; and

. a processing system configured to process the sensor signals to determine a deviation between the sensor data indicated by the sensor signals and a baseline for the process ~~detect a deviation from a baseline for the process~~, compare the deviation to a threshold and generate a trigger if the deviation exceeds the threshold, generate a process vector representing ~~for~~ the deviation ~~in response to detecting the deviation~~, and in response to the trigger, compare the process vector representing the deviation to a plurality of library vectors representing abnormal operating conditions to classify the deviation, ~~and to signal a control system to perform a treatment on the water in response to classifying the deviation as a contaminant in the water~~.

18. (Cancelled)

19. (Amended) The process analysis system of claim ~~17~~ 36 wherein the sensor signals indicate pH, conductivity, turbidity, chlorine, and total organic carbon of the water.

20. (Cancelled)

21. (Amended) The process analysis system of claim ~~17~~ 36 wherein the processing system is configured to signal ~~the~~ a control system to operate a valve in response to classifying the deviation as ~~the~~ a contaminant in the water.

22. (Amended) The process analysis system of claim ~~17~~ 36 wherein the processing system is configured to signal ~~the~~ a control system to add a marker to the water in response to classifying the deviation as ~~the~~ a contaminant in the water.

23. (Original) The process analysis system of claim 22 wherein the marker comprises a colorant.

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24. (Cancelled)

25. (Amended) The process analysis system of claim ~~17~~ 38 wherein the treatment comprises adding a disinfectant to the water.

26. (Amended) The process analysis system of claim ~~17~~ 38 wherein the treatment comprises adding chlorine to the water.

27. (Amended) The process analysis system of claim ~~17~~ 38 wherein the treatment comprises exposing the water to ultraviolet radiation.

28. (Amended) The process analysis system of claim 17 wherein the processing system is configured to process the sensor signals to produce a single variable and compare the single variable to ~~the~~ a threshold to detect the deviation <u>and compare the deviation to the threshold</u> ~~from the baseline~~.

29. (Original) The process analysis system of claim 17 wherein the process vector <u>representing the deviation</u> comprises a unit vector.

30. (Amended) The process analysis system of claim 17 wherein the processing system is configured to compare an angle between the process vector <u>representing the deviation</u> and one of the library vectors <u>representing one of the abnormal operating conditions</u> to <u>another</u> ~~a~~ threshold.

31. (Amended) The process analysis system of claim 17 wherein ~~the library vectors are associated with abnormal operations and~~ the processing system is configured to identify one of the abnormal <u>operating conditions represented by</u> ~~operations that is associated with~~ one of the library vectors that matches the process vector to classify the deviation.

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32. (Amended) The process analysis system of claim 17 wherein the processing system is configured to store the process vector representing the deviation as a new one of the library vectors and associate an a new abnormal operating condition operation with the new library vector in response to an unknown classification.

33. (New) The method of claim 1 wherein the process comprises a system that supplies water.

34. (New) The method of claim 33 wherein the classified deviation comprises a contaminant in the water.

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35. (New) The method of claim 33 further comprising signaling a control system to perform a treatment on the water in response to classifying the deviation as a contaminant in the water.

36. (New) The process analysis system of claim 17 wherein the process comprises a system that supplies water.

37. (New) The process analysis system of claim 36 wherein the classified deviation comprises a contaminant in the water.

38. (New) The process analysis system of claim 37 wherein the processing system is configured to signal a control system to perform a treatment on the water in response to classifying the deviation as a contaminant in the water.

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